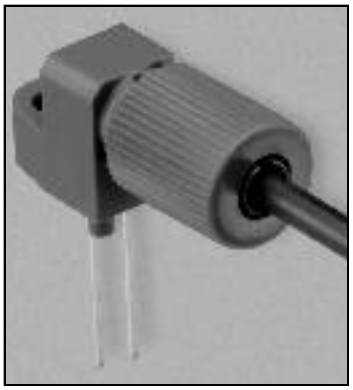
# Plastic Fiber Optic Phototransistor IF-D92



## DESCRIPTION

The IF-D92 is the phototransistor in Industrial Fiber Optics' family of low-cost, medium-frequency, short-distance fiber optic LEDs and detectors. Each device consists of a polycarbonate (PC) housing which retains the internal active element such as an LED or photodetector subcomponent, and a cinch nut to hold the fiber in place. The assembly optimizes coupling between the active element and jacketed 1000 µm plastic fiber.

Working with this family of fiber optics requires no special tools or training. Only a sharp knife or razor blade is needed to terminate the plastic fiber. When the fiber is inserted in the LED or detector housing, the cinch nut is tightened. Thereafter, the fiber can be removed simply by loosening the nut.

### APPLICATIONS

- Household Appliances
- Motor Controller Triggering
- PC-to-Peripheral Links
- Medical Instruments
- Automotive Electronics
- Audio Systems
- Electronic Games
- Robotics Communications

### FEATURES

- Excellent Linearity
- No Optical Design Required
- Mates with Standard 1000 µm Core Jacketed Plastic Fiber Cable
- Internal Micro-Lens for Efficient Coupling
- Inexpensive Plastic Connector Housing
- Connector-Less Fiber Termination and Connection
- Interference-Free Transmission from Light-Tight Housing
- Simple PWB Mounting
- Rugged Screw Attachment

### MAXIMUM RATINGS

($T_A$ = 25°C)

Operating and Storage Temperature Range ($T_{OP}$, $T_{STG}$).....-40° to 85°C

Junction Temperature ($T_J$) .....85°C

Soldering Temperature (2mm from case bottom) ($T_S$) t ≤ 5s .....240°C

Collector Emitter Voltage ($V_{CEO}$)....30 V

Emitter Collector Voltage ($V_{ECO}$) .....5 V

Collector Current ($I_C$).....50 mA

Collector Peak Current ($I_{CM}$) t =1ms.....100 mA

Power Dissipation ($P_{TOT}$) $T_A$ = 25°C..... 100 mW

De-rate Above 25°C.....1.33 mW/°C

### CHARACTERISTICS ($T_A$=25°C)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Wavelength for Maximum Photosensitivity | $\lambda_{PEAK}$ | 870 | nm |
| Spectral Bandwidth (S=10% of $S_{MAX}$) | $\Delta\lambda$ | 400-1100 | nm |
| Switching Times (10% to 90% and 90% to 10%) ($R_L$=1 k, $I_C$=1.0 mA, $V_{CE}$=5 V, λ=950 nm) | $t_r$, $t_f$ | 20 | µs |
| Responsivity min. @ 880 nm<br>@ 632 nm | R | 100<br>50 | µA/µW<br>µA/µW |
| Collector Dark Current ($V_{CE}$=15 volts) | $I_{CEO}$ | < 100 | nA |
| Breakdown Voltage ($I_C$=100 µA) | $BV_{CEO}$ | ≥ 30 | V |
| Breakdown Voltage ($I_C$=100 µA) | $BV_{ECO}$ | ≥ 5 | V |
| Saturation Voltage ($I_C$=250 µA, H= 100 µW) | $V_{CE\ sat}$ | 0.15 | V |

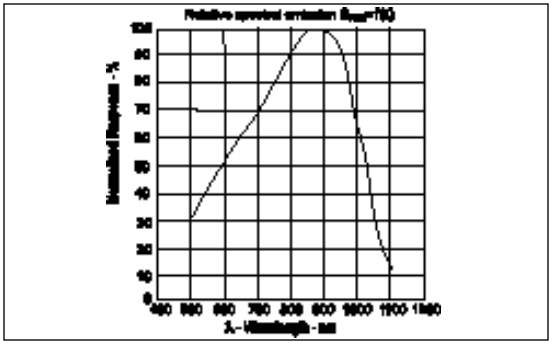


FIGURE 1. Typical detector response versus wavelength.

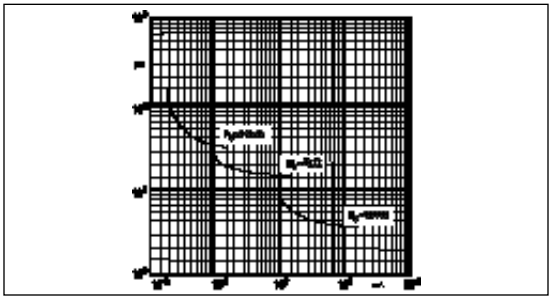


FIGURE 2. Rise and fall times of phototransistor.

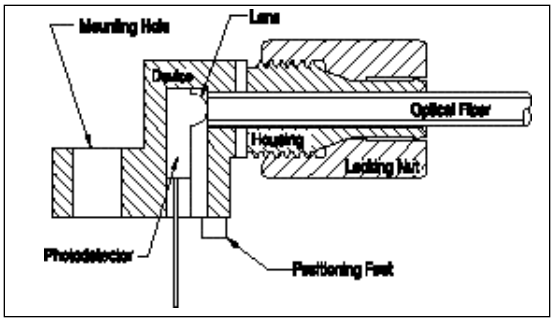
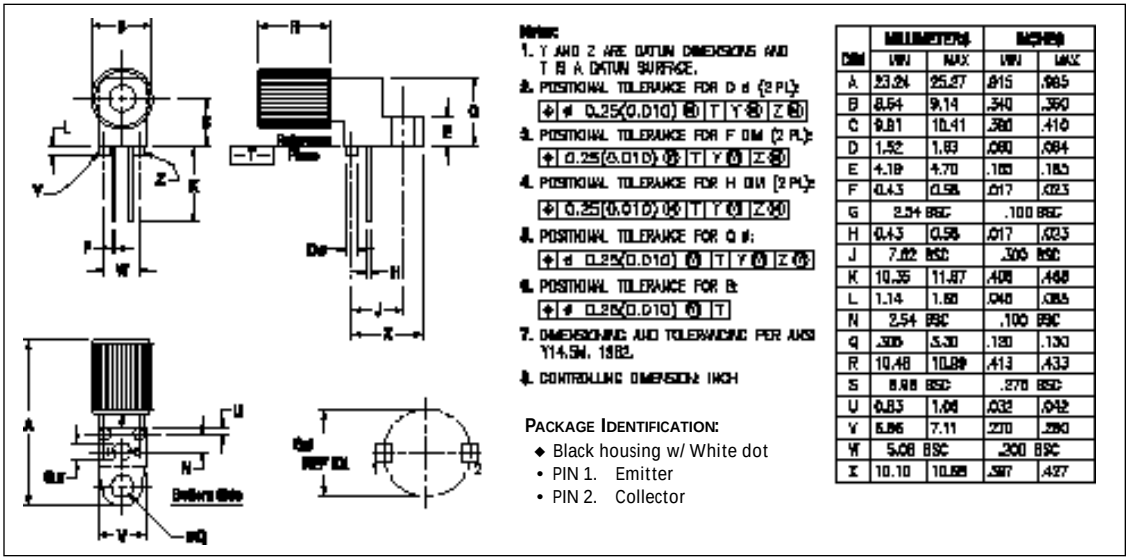



FIGURE 3. Cross-section of fiber optic device.

## FIBER TERMINATION INSTRUCTIONS

1. Cut off the ends of the optical fiber with a single-edge razor blade or sharp knife. Try to obtain a precise 90-degree angle (square).
2. Insert the fiber through the locking nut and into the connector until the core tip seats against the internal micro-lens.
3. Screw the connector locking nut down to a snug fit, locking the fiber in place.



Notes:
1. Y AND Z ARE DATUM DIMENSIONS AND T IS A DATUM SURFACE.
2. POSITIONAL TOLERANCE FOR D ø (2 PL): ⌖ ø 0.25(0.010) Ⓜ T Ⓜ Y Ⓜ Z Ⓜ
3. POSITIONAL TOLERANCE FOR F DIM (2 PL): ⌖ 0.25(0.010) Ⓜ T Ⓜ Y Ⓜ Z Ⓜ
4. POSITIONAL TOLERANCE FOR H DIM (2 PL): ⌖ 0.25(0.010) Ⓜ T Ⓜ Y Ⓜ Z Ⓜ
5. POSITIONAL TOLERANCE FOR Q ø: ⌖ ø 0.25(0.010) Ⓜ T Ⓜ Y Ⓜ Z Ⓜ
6. POSITIONAL TOLERANCE FOR B: ⌖ ø 0.25(0.010) Ⓜ T
7. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
8. CONTROLLING DIMENSION: INCH

PACKAGE IDENTIFICATION:
- ◆ Black housing w/ White dot
- • PIN 1. Emitter
- • PIN 2. Collector

| DIM | MILLIMETERS MIN | MILLIMETERS MAX | INCHES MIN | INCHES MAX |
|---|---|---|---|---|
| A | 23.24 | 25.27 | .915 | .995 |
| B | 8.64 | 9.14 | .340 | .360 |
| C | 9.91 | 10.41 | .390 | .410 |
| D | 1.52 | 1.83 | .060 | .084 |
| E | 4.19 | 4.70 | .165 | .185 |
| F | 0.43 | 0.58 | .017 | .023 |
| G | 2.54 BSC | | .100 BSC | |
| H | 0.43 | 0.58 | .017 | .023 |
| J | 7.62 BSC | | .300 BSC | |
| K | 10.35 | 11.87 | .408 | .468 |
| L | 1.14 | 1.60 | .045 | .055 |
| N | 2.54 BSC | | .100 BSC | |
| Q | .305 | 5.30 | .120 | .130 |
| R | 10.46 | 10.89 | .413 | .433 |
| S | 6.86 BSC | | .270 BSC | |
| U | 0.83 | 1.04 | .033 | .042 |
| V | 6.86 | 7.11 | .270 | .280 |
| W | 5.08 BSC | | .200 BSC | |
| X | 10.10 | 10.69 | .397 | .427 |

FIGURE 4. Case outline.